plates, there are 215 figures in the text, all of which appear to have been specially drawn for the book, and many are quite original. The coloured figures are reproduced by the three-colour process, and are on the whole satisfactory, though one or two are scarcely recognisable. The text-figures include line-drawings of the forms of crystals, and excellent half-tones representing actual crystals and mineral specimens.

To the English student of mineralogy such a book might be used with advantage as a German reading book. The sentences are short and not involved.

A Synopsis of the Orthoptera of Western Europe. By Dr. Malcolm Burr. Pp. 160. (London: Oliver Janson, 1910.) Price 3*s*.

THE present work appeared in instalments from 1903 to 1909 in the *Entomologist's Record*, and in its present form will be extremely useful as an introduction to the subject, and as a tourist's guide, especially as its small size renders it more convenient than Brunner von Wattenwyl's work on European Orthoptera, or that of Tümpel's on those of Central Europe. Dr. Burr's work includes all the countries west of (and including) the neighbourhood of Vienna. For eastern Europe we have (for those who can use it) the great Russian expansion of Tümpel's book by Jacobsen and Bianchi, which includes all the Orthoptera of central and eastern Europe, and Palæarctic Asia.

Dr. Burr has given short but careful descriptions of genera and species, and also tables of species under the genera, and he has very properly included the more important naturalised species, such as *Periplaneta australasiae*. Orthoptera are, however, very liable to be carried about from one place to another, and mere casual visitors are very properly only mentioned by name, as on pp. 17, 18, &c. A long-legged Japanese grasshopper, *Diestrammena marmorata*, not mentioned by Dr. Burr, has several times been captured recently in London.

Prehistoric Man. By Joseph McCabe. Pp. viii + 128. (London: Milner and Co., Ltd., n.d.) Price 1*s*. net.

THIS book gives an excellent popular exposition of the present state of our knowledge of prehistoric anthropology. The chapters on Palæolithic man and his implements are full of interest. Within the last few years a considerable number of more or less complete Palæolithic skeletons have been discovered in France and elsewhere, and great additions have been made to our knowledge of man in this distant epoch. In this little volume will be found a lucid description of the latest discoveries. The author is not content to give a mere list of more or less disconnected data, but always endeavours to weave his material into a continuous evolutionary story. This tendency, though admirable in a popular writer, appears in some cases to lead to a slight distortion of the facts in order to make them fit into the theory. For example, the Palæolithic race represented by the Grimaldi, Galley-hill, and other remains is assigned to the later Palæolithic, though the geological evidence appears to be pretty clear that these remains belong at least to the middle Palæolithic. The Gibraltar skull has recently been shown by Dr. Keith to have been the first Palæolithic skull found (1843) in Europe, and to represent one of the most primitive races. This discovery does not appear to have been known to the author.

The chapters on the Neolithic and Bronze ages show that our knowledge of these periods is still in a very unsatisfactory condition, but that is not, of course, the fault of the author of this work.

(1) *Metallografia applicata ai Prodotti Siderurgici.* By Umberto Savoia. Pp. xvi + 205. (Milan: U. Hoepli, 1909.) Price 3.50 lire.

(2) *Lo Zinco.* By Prof. R. Musu-Boy. Pp. xiv + 219. (Milan: U. Hoepli, 1909.) Price 3.50 lire.

BOTH these little treatises belong to the excellent series of "Manuali Hoepli," and, like other members of the series, are written by specialists in their respective subjects. They possess the merit, common to practically all other works of this series, of imparting in the fewest possible words the most essential facts and principles. The treatise on the metallography of iron is essentially a practical guide for the laboratory worker. Its author was sent from Italy to study the methods adopted in the laboratories of Le Chatelier, Fremont, and Guillet, and on returning home established the metallographical laboratory of the Milan steel works. The author has selected for description the methods he has found best suited in practice, and has illustrated the work by nearly 100 of his own microphotographs of steel in its different states.

The treatise on zinc is of a more general character, and calls for little comment. It deals with the ores, methods of extraction, history, statistics, and uses of the metal.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Ooze and Irrigation.

MAY I be allowed to reply to some inquiries?

(1) It is thought by some that my remarks applied especially to foreign lands. Let me point out that the ooze of our English rivers is often just as fertile as that of the Nile, and that the number of annelids found in the ooze is enormous. This may be illustrated by reference to the Thames. The late Frank Buckland tells us that when he kept fish he "fed them with red worms collected from the Thames mud. These worms cost 4*s*. 6*d*. a quart; the price of Thames worms, like everything else, has increased considerably." Now whether these worms were true annelids, or merely the larvæ of insects, the point is the same. In the case of Tubifex and its allies, a quart would mean many hundreds of thousands. Mr. Shrubsole, myself, and others, have frequently examined the ooze from various parts of the Thames, and the number of different species of mud-frequenting worms is very great, while it is utterly impossible to estimate the total of individuals.

(2) Another interesting point is continually coming under my observation. When a number of annelids taken from the ooze is examined, it is found that the tail, which is in constant rhythmical motion in the water, is festooned with numbers of symbiotic vorticels. These move to and fro in the water, and are constantly capturing the bacteria and other lowly forms of life with which the putrid water is laden. So far as I am aware, no biologist has ever given this fact, or the action of the vorticels, any detailed study with a view to ascertaining their action, and their relation to their host on the one hand, and the water and soil on the other.

(3) It would be of great value to science if someone would carefully examine the ooze before and after passing through the bodies of annelids, and ascertain what is the nature of the change that has taken place. Is there any difference between the quantity of nitrogen in pure mud and that which has been digested?

These and many other problems having a vital bearing on agriculture need attention, and it is to be hoped that

at least a small portion of the time of the new commission will be devoted to a subject of such importance.

Malvern. HILDERIC FRIEND.

IN some interesting remarks upon this subject (NATURE, pp. 427, 489), the Rev. Hilderic Friend suggests—and I believe he is correct in assuming for the first time—that the alluvial mud of such a river as the Nile derives its fertility, not from the nature of the sediment itself, as usually supposed, nor entirely from bacteria, but from the multitudinous remains of annelids that live in the mud.

That there is "need for careful study of the alluvium of rivers from this point of view," and any other, is to be freely admitted. If we except the study of pre- and post-Pleistocene deposits carried out by Mr. Clement Reid, and summarised in his "Origin of the British Flora," there is scarcely another work that can be mentioned dealing with the subject. It is true that lately the Geological Survey have become alive to the necessity of introducing details as to the fertility or otherwise of the soils derived from the geological formations surveyed. But these are isolated, and are but the necessary outcome of previous activities of agricultural experimental stations. But neither have these latter undertaken any systematic study of the character and constituents of river alluvium. The nearest approach to a treatise on the subject is Darwin's "Earthworms," and his work, whilst dealing with terrestrial forms and their influence in fertilising, renewing, and enriching the soil, strangely enough bears out Mr. Hilderic Friend's suggestion as to the cause of alluvial fertility.

For without earthworms, what would the soil be? *Ergo*, without fluviatile annelids, what would the alluvium be—but a sterile accumulation of sand? Here we may add that where worms are too plentiful on land bad results follow, so too we may assume, accepting the worm-fertilising theory as correct, that an excess of annelids tends to cause, as on land, putrefaction, as may be illustrated by the case of ponds overstocked with blood-worms, causing the appearance of blood, which was a fruitful source of superstition in former days, notably at Garendon in this district.

But apart from theoretical considerations, based on the hypothesis that Tubifex and other annelids do tend to increase fertility, we may attempt to draw an analogy with former conditions, and so to some extent corroborate Mr. Friend's very probable theory.

All who have made any study of the palæontology of the Trias (referring here specially to Britain) are familiar with the extreme barrenness of great thicknesses of both Lower and Upper Keuper relieved alone by certain limited horizons at which a definite flora and fauna is to be met with.

It has been assumed, and there is *apparently* no great reason against this on a purely faunistic basis, that the Trias is a desert formation; but on other grounds, and also from a study of the flora and fauna, I have come to the conclusion (during a study of the Midland Trias, in which I am aided by a Government grant from the Royal Society) that the whole of the Triassic formation is a *delta* formation, in other words, that from the Bunter (first suggested to be a delta deposit by Prof. Bonney) upwards conditions similar to those in the Nile area prevailed during Triassic times, and were responsible for its *formation*. Locally, wind acted on rocks, but formed no deposit.

Now it is a remarkable fact that in the deposits in the British Keuper, in which alone plant-remains have so far been discovered, or where carbonaceous deposits occur, that a common associate of the plant-remains is a form of track or casting which has usually been ascribed to annelids or crustacea; and we must not overlook the fact that annelids alone are not the predominating component of the fauna of alluvial tracts, but Protozoa in their myriads, occasionally sponges, Crustacea (minute and large), insects, scorpions, and molluscs form a large proportion of the bulk of alluvial deposits. Of these, annelids and Crustacea are most likely to be preserved, and are most often discovered in the rocks. So that it seems that only where annelid life in Triassic times was abundant was plant-life in evidence, just as now only where the Nile is alluvial does it yield productive results, due, apparently, to the same cause. The analogy I have drawn strengthens Mr. Friend's theory, and, moreover, if the worms be found to be actually conducive to fertility (by experiment or otherwise), my case for the delta-origin of the Trias will receive additional confirmation.

It would seem to us that no more fitting study could be made by the lake surveys that are now going on in different parts of the kingdom than the very probable connection between worms and alluvium, for it seems that Mr. Friend has more or less proved his case without much need for argument. This affords another instance of the utility of beings hitherto supposed to have no useful part to play in the history of time or things.

July 2. A. R. HORWOOD.

A Singular Mammal called "Orocoma."

IN a letter of the Jesuit Father Cat at Buenos Aires, dated May 18, 1729 ("Lettres difiantes," éd. Lyon, 1819, tom. v., p. 466), the following passage occurs:—

"Outre ces animaux, il en est un qui m'a paru fort singulier: c'est celui que les Moxes appellent *orocoma* [or *ocorome*, according to the "Abrégé d'une Relation espagnole," in the same tome, p. 66]. Il a le poil roux, le museau pointu, et les dents larges et tranchantes. Lorsque cet animal, qui est de la grandeur d'un gros chien, aperçoit un Indien armé, il prend aussitôt la fuite; mais s'il le voit sans armes, il l'attaque, le renverse par terre, le foule à plusieurs reprises, et quand il le croit mort, il le couvre de feuilles et de branches d'arbres, et se retire. L'Indien, qui connoit l'instinct de cette bête, se lève dès qu'elle a disparu, et cherche son salut dans la fuite, ou monte sur un arbre, d'où il considère à loisir tout ce qui se passe. L'orocomo ne tarde pas à revenir accompagné d'un tigre qu'il semble avoir invité à venir partager sa proie; mais ne la trouvant plus, il pousse des hurlemens épouvantables, regarde son compagnon d'un air triste et désolé, et semble lui témoigner le regret qu'il a de lui avoir fait faire un voyage inutile."

In asking what mammalian species this "orocoma" is, and whether there is the slightest foundation for this story, I fully know I am showing my great ignorance. I hope the Editor and his readers will forgive me, taking into account the entire absence of a scientific reference library in this part. KUMAGUSU MINAKATA.

Tanabe, Kii, Japan, June 15.

Pwdre Ser.

WHEN a boy, at the latter end of the 'thirties of last century, I was told by a well-known man of the name of West—lock-keeper on the river Witham at Lincoln—that he had seen a star fall on the south common there, where he had a cow grazing, and that, on going up to it, he found nothing but a lump of jelly. At this distance of time I cannot recall all he said, but I remember he described the object as shining and as about the size of a plate. I have no recollection of his calling it luminous.

Up to this time I have always thought my informant was under an illusion, but, after Mr. McKenny Hughes's article, there seems to be something more than I was aware of in the account he gave me.

F. M. BURTON.

Highfield, Gainsborough, July 2.

Curve Tracing and Curve Analysis.

I HAVE unwittingly done an injustice to Mr. R. H. Duncan's book on "Practical Curve Tracing" (vol. lxxxiii., p. 461). I judged by the review of it in NATURE of June 9 that it deals only with the subject indicated by its title. After writing to you regretting that no author deals with practical curve analysis, I bought Mr. Duncan's book, and find that, after describing each class of curve and how to trace it, he gives clear directions for reversing the process and deducing a formula from a given curve. So far as it goes, the book excellently meets the want which I expressed, and my only regret is that the author has not developed the subject a little further.

A. P. TROTTER.

London, July 5.